

Subject Description Form

Subject Code	AAE5105
Subject Title	Fleet Management and Aviation Sustainability
Credit Value	3
Level	5
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	<p>This subject will provide students with</p> <ol style="list-style-type: none"> 1. advanced airline fleet management, crew pairing and fatigue management; and 2. the advanced engines types, aviation fuel, emission mitigation strategy, sustainable aviation system in airline aspect.
Intended Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <ol style="list-style-type: none"> a. design and develop mathematical modelling in resolving airline fleet, crew pairing and aircraft routing problem; b. design and develop proper airline resource planning in profitable manner; c. evaluate the impact of aviation emission and its mitigation strategy; and d. determine airline solution contributing to the societal, economic and global environment factors.
Subject Synopsis/ Indicative Syllabus	<p>Operations management, fleet and crew management and flight route management: Airline fleet management, crew management, aircraft routing and sustainability; Aircraft model configuration and serviceability; Air route planning and schedule recovery; Aircraft life cycle and associated legislation; Risk management in airline operation; Human resource management: crew pairing and rostering management.</p> <p>Sustainable aviation: Carbon budgets for aviation; Environmental technology and the future of flight; Aviation and the EU emissions trading system; Airport noise control and modelling; Environmental impact of aviation emission; Sustainable aviation system.</p> <p>Airline strategic planning: Coalition, competition, integration and substitution; Pricing strategies; Business models of full-service carriers and low-cost carriers; Competition of airline and high-speed rail; Changes of airline business in post-pandemic situation.</p>

Teaching/Learning Methodology	<p>Teaching is conducted through lectures and assignments. The basic knowledge, research methodology and theoretical models will be introduced.</p> <p>The understanding of how to address and formulate problems by using mathematical programming, OR and optimisation algorithms techniques with modern programming language is emphasised. Research methodology, data analytics skills, algorithm design skills and programme methods are taught in class as well as the related real-life scenarios using data to enhance their research abilities.</p> <table border="1" data-bbox="531 544 1383 750"> <thead> <tr> <th data-bbox="531 544 871 680">Teaching/Learning Methodology</th> <th colspan="4" data-bbox="871 544 1383 607">Outcomes</th> </tr> <tr> <td data-bbox="531 680 871 750"></td> <th data-bbox="871 607 997 680">a</th> <th data-bbox="997 607 1123 680">b</th> <th data-bbox="1123 607 1249 680">c</th> <th data-bbox="1249 607 1383 680">d</th> </tr> </thead> <tbody> <tr> <td data-bbox="531 680 871 750">Lecture</td> <td data-bbox="871 680 997 750">√</td> <td data-bbox="997 680 1123 750">√</td> <td data-bbox="1123 680 1249 750">√</td> <td data-bbox="1249 680 1383 750">√</td> </tr> </tbody> </table>					Teaching/Learning Methodology	Outcomes					a	b	c	d	Lecture	√	√	√	√																			
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Assessment Methods in Alignment with Intended Learning Outcomes	<table border="1" data-bbox="531 808 1383 1290"> <thead> <tr> <th data-bbox="531 808 871 1010" rowspan="2">Specific assessment methods/tasks</th> <th data-bbox="871 808 1019 1010" rowspan="2">% weighting</th> <th colspan="4" data-bbox="1019 808 1383 943">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th> </tr> <tr> <th data-bbox="1019 943 1115 1010">a</th> <th data-bbox="1115 943 1211 1010">b</th> <th data-bbox="1211 943 1307 1010">c</th> <th data-bbox="1307 943 1383 1010">d</th> </tr> </thead> <tbody> <tr> <td data-bbox="531 1010 871 1081">1. Assignment</td> <td data-bbox="871 1010 1019 1081">20%</td> <td data-bbox="1019 1010 1115 1081">√</td> <td data-bbox="1115 1010 1211 1081">√</td> <td data-bbox="1211 1010 1307 1081"></td> <td data-bbox="1307 1010 1383 1081"></td> </tr> <tr> <td data-bbox="531 1081 871 1153">2. Mid-term examination</td> <td data-bbox="871 1081 1019 1153">30%</td> <td data-bbox="1019 1081 1115 1153"></td> <td data-bbox="1115 1081 1211 1153">√</td> <td data-bbox="1211 1081 1307 1153">√</td> <td data-bbox="1307 1081 1383 1153">√</td> </tr> <tr> <td data-bbox="531 1153 871 1225">3. Final examination</td> <td data-bbox="871 1153 1019 1225">50%</td> <td data-bbox="1019 1153 1115 1225"></td> <td data-bbox="1115 1153 1211 1225">√</td> <td data-bbox="1211 1153 1307 1225">√</td> <td data-bbox="1307 1153 1383 1225">√</td> </tr> <tr> <td data-bbox="531 1225 871 1290">Total</td> <td data-bbox="871 1225 1019 1290">100%</td> <td colspan="4" data-bbox="1019 1225 1383 1290"></td> </tr> </tbody> </table> <p>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p>Overall Assessment:</p> <p style="text-align: center;">$0.5 \times \text{Continuous Assessment} + 0.5 \times \text{Final Examination}$</p> <p>The continuous assessment (50%) is aimed at enhancing the students' comprehension and assimilation of various topics of the syllabus via assignment and mid-term examination. The final examination (50%) will also be considered to assess the students learning outcome.</p>					Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)				a	b	c	d	1. Assignment	20%	√	√			2. Mid-term examination	30%		√	√	√	3. Final examination	50%		√	√	√	Total	100%				
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Student Study Effort Expected	Class contact:																																						
	▪ Lecture		39 Hrs.																																				
	Other student study effort:																																						
	▪ Self-study / preparation		66 Hrs.																																				
	Total student study effort		105 Hrs.																																				

Reading List and References

1. Abdelghany, A., & Abdelghany, K. (2016). Modeling applications in the airline industry. Routledge.
2. Bazargan, M. (2016). Airline operations and scheduling. Routledge.
3. Bridger, R. (2013). Plane truth: Aviation's real impact on people and the environment.
4. Budd, L., Griggs, S., & Howarth, D. (2013). Sustainable aviation futures. Emerald Group Publishing.
5. Clark, P. (2017). Buying the big jets: fleet planning for airlines. Taylor & Francis.
6. Walker, T., & Bergantino, A. S. (2020). Sustainable Aviation. Palgrave Macmillan.
7. Wu, C.-L. (2016). Airline operations and delay management: insights from airline economics, networks and strategic schedule planning: Routledge.

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